



# Delaware's Efforts to Improve Water Quality in the Chesapeake

Jennifer Volk

Delaware Department of Natural Resources and Environmental Control

December 10, 2009

# Overview

- Delaware's involvement with Chesapeake Bay Program
- Delaware TMDLs
- Tributary Action Teams/Pollution Control Strategies
- Progress to Date
- Chesapeake Bay TMDL
- Watershed Implementation Plan and 2-year milestones
- Next Steps

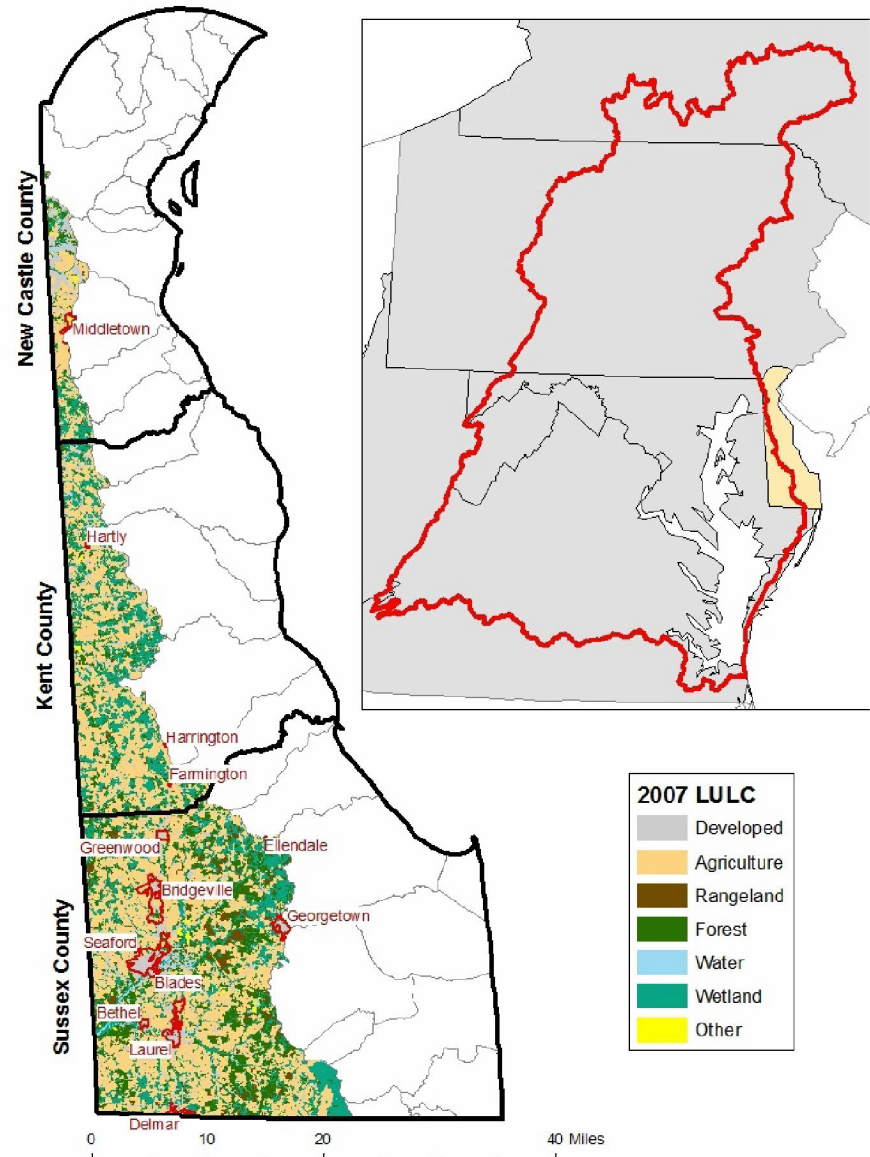
# Chesapeake Bay Program

- Formed in 1980s with goals of reducing pollutants entering the Bay and restoring the Bay's living resources
- Agreements
  - 1983-original pledge to work together to restore the Bay between governors of MD, VA, PA, mayor of DC, EPA, and Chesapeake Bay Commission
  - 1987-goal to reduce nitrogen and phosphorus by 40% by 2000
  - 2000-comprehensive plans with 2010 goal for restoration
    - Governors of NY and DE (Carper) committed to goals of the *Chesapeake 2000 Agreement* by signing a multi-jurisdictional Memorandum of Understanding with the Executive Council in 2000 (WV signed in '02)



# The Chesapeake Bay Watershed in Delaware

- Within all 3 counties
- Very rural character:
  - Developed 10%
  - Agriculture 48%
  - Rangeland 3%
  - Forest 16%
  - Water 1%
  - Wetland 21%
  - Other 1%
- Small, but growing, towns





# Water Quality Impairments in the Chesapeake

- Monitoring data shows low dissolved oxygen and high levels of nitrogen, phosphorus, and bacteria
- Stream segments listed as impaired
- Required to establish Total Maximum Daily Loads
  - Maximum amount of a pollutant that can enter a water body and still achieve water quality standards

$$\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}$$

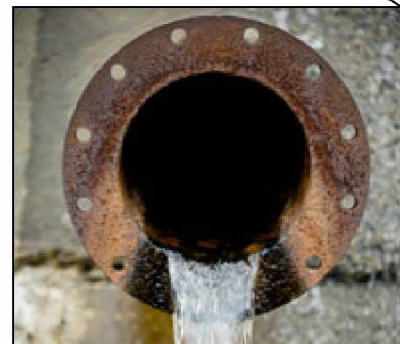
- WLA = waste load allocation (point sources)
- LA = load allocation (nonpoint sources)
- MOS = margin of safety



# Delaware TMDLs

- 1998 - Nitrogen and Phosphorus TMDLs for Nanticoke
- 2006 - Nitrogen and Phosphorus TMDLs for Chester, Choptank, Marshyhope, & Pocomoke
- 2006 - Bacteria TMDLs across the Chesapeake Drainage
- EPA TMDL covering entire 6-state and DC Chesapeake Watershed coming soon

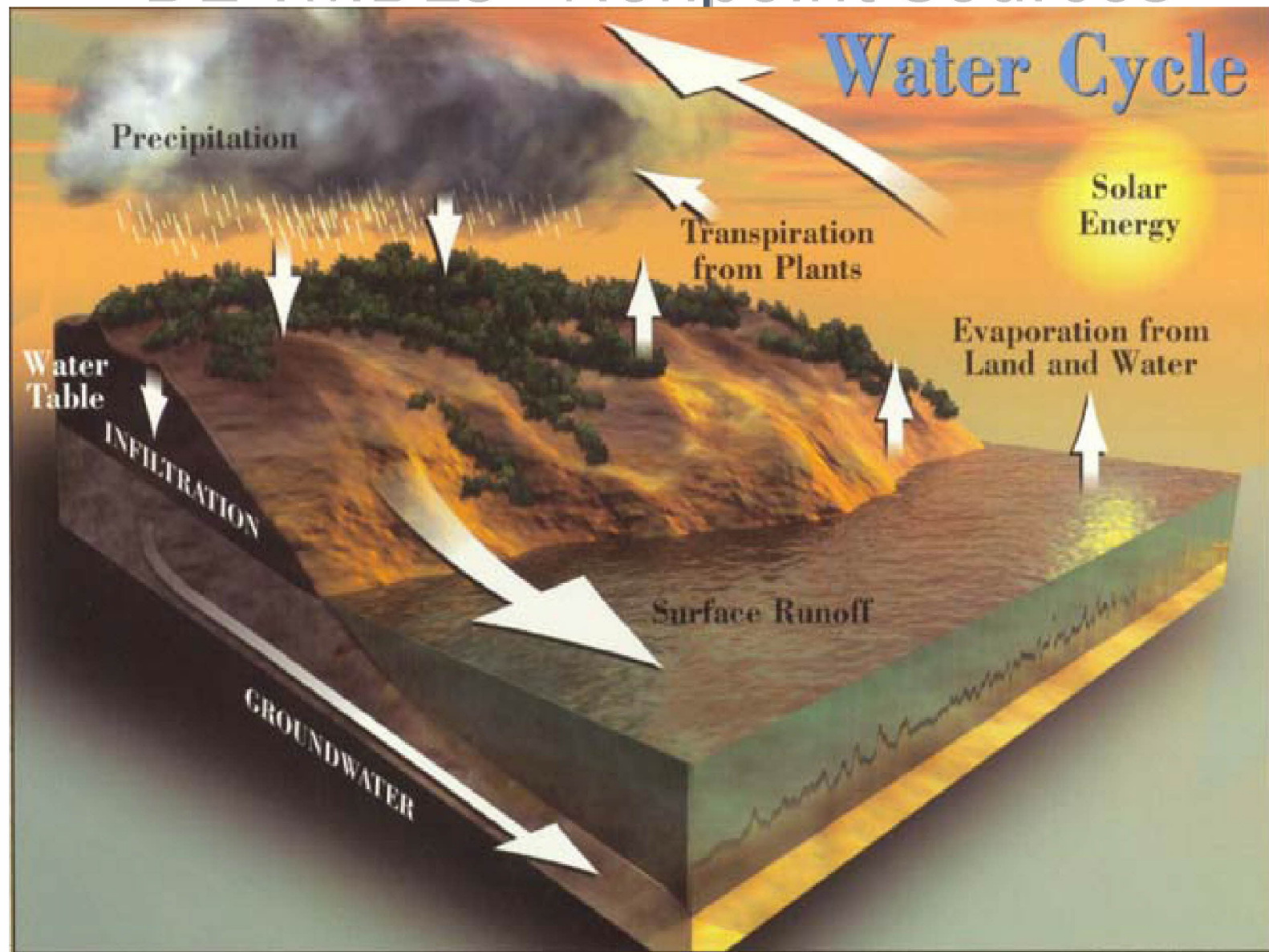
# DE TMDLs- Point Sources



- Addressed by Nanticoke TMDL
  - Municipalities of Bridgeville, Laurel, and Seaford required to implement Biological Nutrient Removal (BNR) or equivalent
    - Facility upgrades
    - Operating below current permit limits
    - Towns want to grow and anticipate a need to increase capacity
    - Will need alternative disposal options or trading (no official policy)
  - Invista - industrial facility that uses surface & groundwater for cooling
    - Monitoring study of intake water was conducted
    - Permit to be revised to cut Total Nitrogen in half
  - Other minor point sources capped (one eliminated and two significantly decreased their discharge since TMDL)

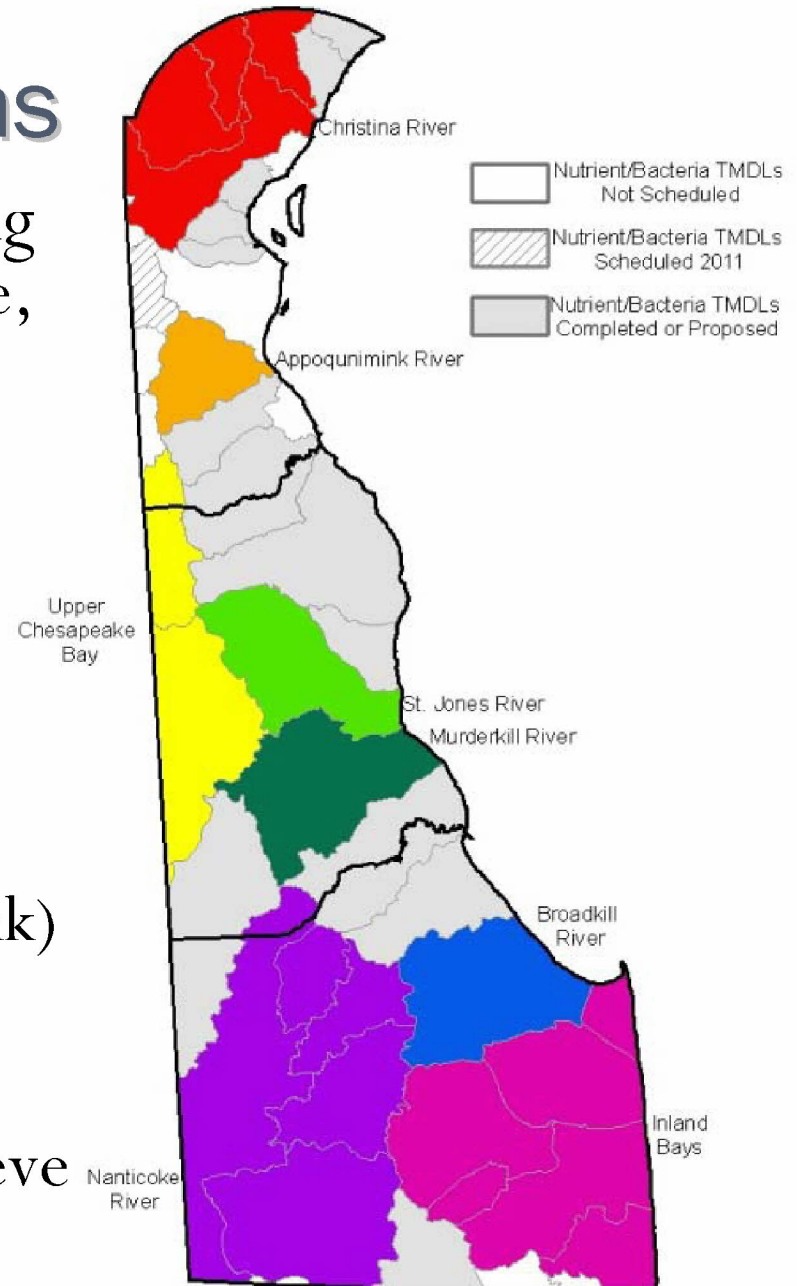


# DE TMDLs - Nonpoint Sources



# Tributary Action Teams

- A group of citizens with varying interests, concerns, knowledge, and beliefs
- Meet with the purpose of recommending a Pollution Control Strategy to the Department
  - Began in 1998 in Nanticoke
  - Began in 2007 in Upper Chesapeake (Chester/Choptank)
- Combination of voluntary and required actions
- Set of actions designed to achieve the TMDL



# TAT Recommendations

- Onsite Wastewater Treatment and Disposal System
  - Performance standards for septic systems
  - Septic inspection program
  - Connect failing septic systems to sewer
- Developed lands
  - Riparian buffers in new developments
  - Limit impervious cover
  - Better stormwater management in new development
  - Stormwater retrofits on existing developed lands
- Education and outreach





# Agriculture

- Preserve working lands
- Install sediment traps in tax ditches
- Fence animals out of ditch right-of-ways
- Comprehensive cost-share programs for best management practices (increase funding, rates, caps)
  - Better outreach about availability of programs
- Allow grass filter strips/ waterways/buffers to be harvested as energy crops
- BMP goals should include a combination of practices that minimize the acreage taken out of production.



# Improvements Over Time

- Wastewater Requirements
  - New Castle County - A good portion of new development is within sewer districts
  - Kent County - Comp Plan calls for all new onsite systems to use advanced treatment to meet TMDLs or Best Available Technology
  - Sussex County - Performance standards and inspection requirements for new & replacement all sized systems in the Inland Bays (also recommended by the Nanticoke TAT)
  - Onsite regulations currently open for revision
    - Proposing to require performance standards for large systems and inspection requirements state-wide

# Improvements Over Time

- Development Patterns/Stormwater Requirements
  - Multi-agency Preliminary Land Use Service (PLUS)
  - State review of municipal Comprehensive Plans
  - Nutrient Budget Protocol
  - 1990 DE Sediment and Stormwater Law
    - All new development to manage stormwater for quantity and sediment
  - ~2000 - S&SW regulations modified to require developers to consider green technologies first
  - S&SW regulations currently open for revisions
    - Proposing to require more infiltration which will further reduce pollutant loads from new development runoff



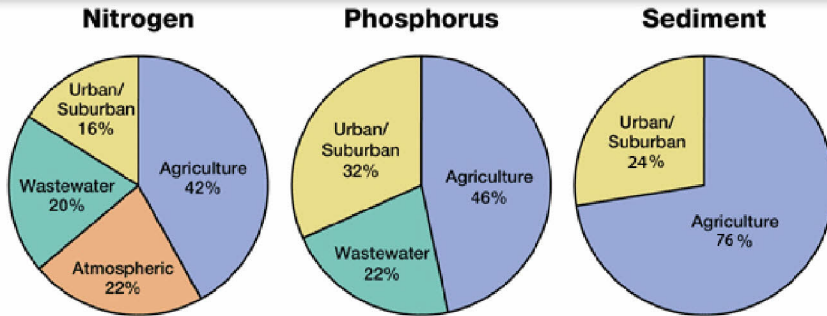


# Improvements Over Time

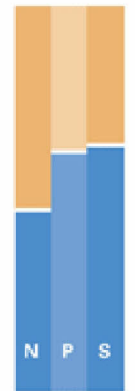
- Agriculture
  - Nutrient Management Law
    - Applies to >10 acres of fertilized land
    - Nutrient Management Plans as of January 1, 2007
    - Education outreach through certification programs
  - Manure relocation program
  - Phytase in poultry feed
  - Increased cover crop cost-share rates have led to record sign-ups
  - Increased participation in other cost-share programs for other BMPs

# Percent of Goal Achieved

Relative Responsibility for Pollution Loads to the Bay (2008)

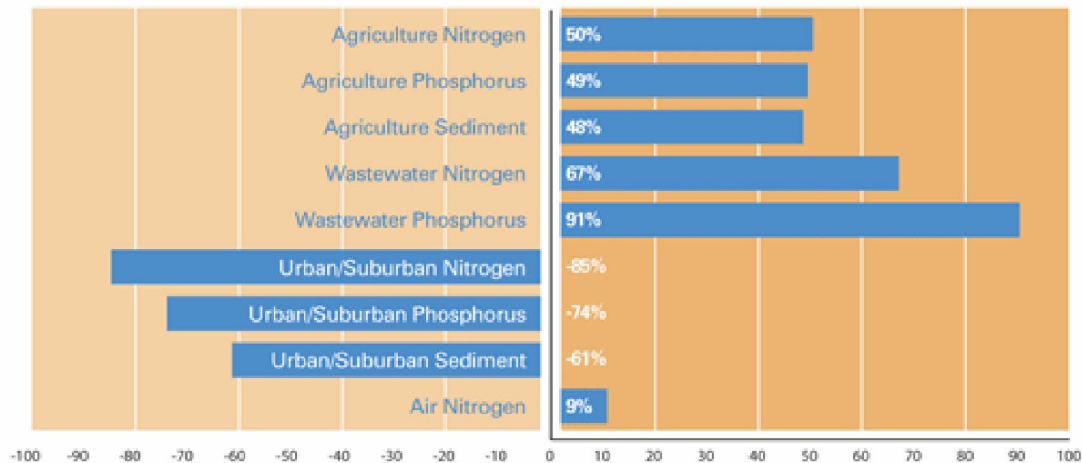


Wastewater loads based on measured discharges; the rest are based on an average-hydrology year. Does not include loads from direct deposition to tidal waters, tidal shoreline erosion or the ocean.

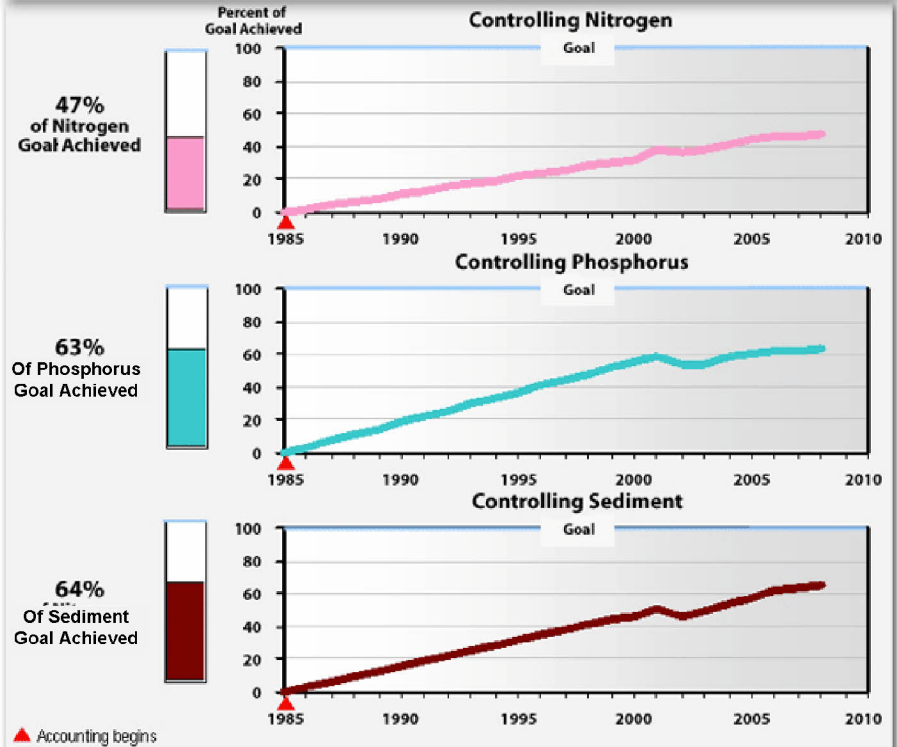


47% 63% 64%  
OF GOALS ACHIEVED

N: Nitrogen  
P: Phosphorus  
S: Sediment



Pollution Control Index

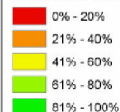


## Nitrogen Pollution Controls Summary (2007)

Percent of Goal Achieved &  
Percent Responsibility for Achieving Goal by State-Basin



### Percent of Goal Achieved



### Percent Responsibility for Achieving Bay-wide Goal

Basin	Percent
1	5.46%
2	29.24%
3	1.82%
4	0.17%
5	0.02%
6	7.84%
7	10.97%
8	0.51%
9	1.66%
10	8.28%
11	1.94%
12	3.83%
13	1.80%
14	0.01%
15	7.39%
16	2.91%
17	2.09%
18	13.25%
19	0.81%



Data Source: Chesapeake Bay Program.  
Disclaimer: [www.chesapeakebay.net/terms/use.htm](http://www.chesapeakebay.net/terms/use.htm)

Created by KJH, 03/24/08

0 20 40 60 Kilometers  
0 25 50 100 Miles  
UTM Zone 18N, NAD

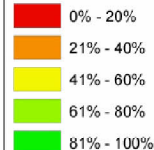
# Percent of Goal Achieved

## Phosphorous Pollution Controls Summary (2007)

Percent of Goal Achieved &  
Percent Responsibility for Achieving Goal by State-Basin



### Percent of Goal Achieved



### Percent Responsibility for Achieving Bay-wide Goal

Basin	Percent
1	3.94%
2	13.90%
3	1.09%
4	0.17%
5	0.02%
6	5.21%
7	7.83%
8	0.34%
9	2.12%
10	11.30%
11	2.11%
12	0.00%
13	1.31%
14	0.06%
15	6.34%
16	4.54%
17	4.68%
18	35.39%
19	1.03%



Data Source: Chesapeake Bay Program.  
Disclaimer: [www.chesapeakebay.net/terms/use.htm](http://www.chesapeakebay.net/terms/use.htm)

Created by KJH, 03/24/08

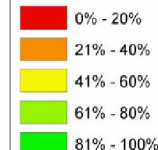
0 25 50 100 Kilometers  
0 25 50 100 Miles  
UTM Zone 18N, NAD

## Sediment Pollution Controls Summary (2007)

Percent of Goal Achieved &  
Percent Responsibility for Achieving Goal by State-Basin



### Percent of Goal Achieved



### Percent Responsibility for Achieving Bay-wide Goal

Basin	Percent
1	2.43%
2	10.20%
3	4.43%
4	0.13%
5	0.02%
6	9.74%
7	3.77%
8	0.17%
9	6.36%
10	12.06%
11	0.71%
12	0.01%
13	5.29%
14	0.17%
15	12.51%
16	7.67%
17	3.27%
18	20.25%
19	0.89%



Data Source: Chesapeake Bay Program.  
Disclaimer: [www.chesapeakebay.net/terms/use.htm](http://www.chesapeakebay.net/terms/use.htm)

Created by KJH, 03/24/08

0 20 40 60 Kilometers  
0 25 50 100 Miles  
UTM Zone 18N, NAD 83



# Chesapeake Bay TMDL

- Progress to date has not been enough
- Need to accelerate progress
- We anticipate that EPA TMDL required reductions for nitrogen and phosphorus will exceed DE TMDLs; additionally, DE does not have State TMDLs for sediment (because we don't have sediment standards)
- Will need to develop a Watershed Implementation Plan and solicit public input

# Bay-wide Draft Target Loads

	Nitrogen (million pounds)	Phosphorus (million pounds)
2008	284	16.3
2017 interim goal	232	15.4
<b>2025 final goal</b>	<b>198</b>	<b>14.8</b>

# Delaware Draft Target Loads

	Nitrogen (million pounds)	Phosphorus (million pounds)
2008	9.91	0.34
2017 interim goal	7.11	0.30
<b>2025 final goal</b>	<b>5.25</b>	<b>0.28</b>

# Watershed Implementation Plans

- How we will achieve and maintain allocations
- Identify a schedule for accomplishing reductions with specific dates for implementing key actions (new regulations, improved compliance, securing additional resources for cost-sharing, etc.)
  - As soon as possible
  - 2-Year Milestones
  - No later than 2025
- Signatory states expected to base all control actions identified in their Plans on regulations, permits, or enforceable agreements
  - Headwater states not expected to do this, but strongly encouraged to do so

# WIP Elements

1. Interim and final nutrient and sediment loads
2. Current loading baseline and program capacity
3. Account for growth - offset any new or increased loads from population growth and land use changes anticipated in the coming decades
4. Gap analysis
5. Commitment and strategy to fill gaps - new/enhanced policies, programs, authorities, and/or regulations
6. Tracking and reporting protocols
7. Contingencies for slow or incomplete implementation
8. Appendix with detailed targets and schedule



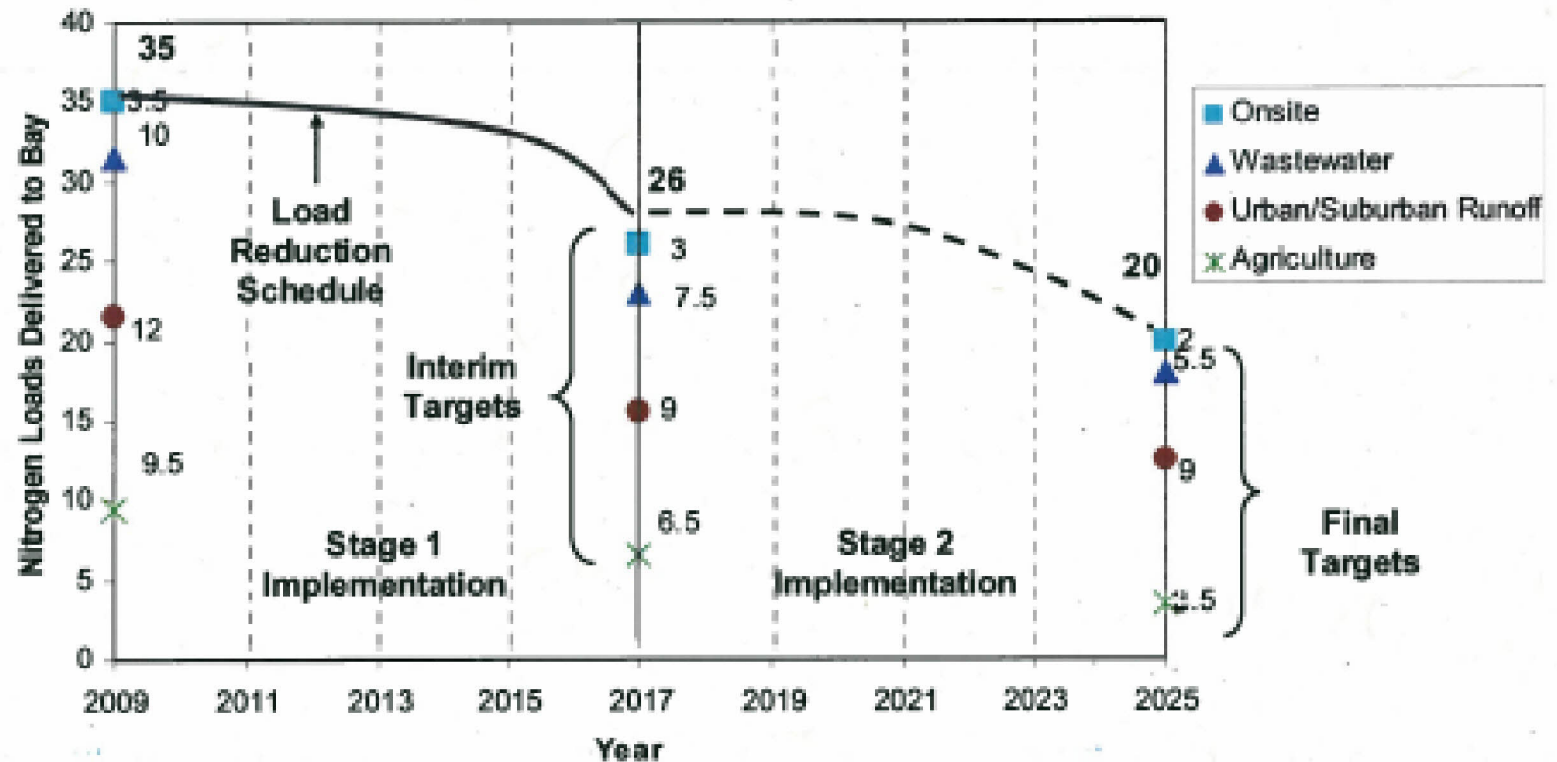
# WIP Development Process

- Phase 1: Jurisdictions divide target loads among point and nonpoint sources; provide description of authorities, actions, and control measures that will be implemented
- EPA will consider this when establishing TMDL wasteload allocations for point sources and load allocations for nonpoint sources
- Preliminary Phase 1 WIP due June 1, 2010
- Draft Phase 1 WIP due August 1, 2010
- Final Phase 1 WIP due November 1, 2010

# WIP Development Process

- Phase 2: Further divide allocations among smaller geographic areas or facilities
  - Finer scale allocations to help local governments, conservation districts, and watershed associations, etc. to better understand their contribution and responsibilities
  - Must identify interim water quality goals (60% of the controls in place by 2017)
  - Draft Phase 2 WIP due June 1, 2011
  - Final Phase 2 WIP due November 1, 2011

i. By Source Sector



- Source Sector
- Stream Segment
- Local Area (County/Sub-watershed)

# WIP Development Process

- Phase 3: refined actions and controls that will be implemented between 2018 and 2025
  - Phase 3 WIP due 2017



# WIP Accountability

- States will identify and commit to implement specific pollutant reduction controls and actions in successive 2-year milestones
  - First set of milestones: May 2009 - December 2011
- EPA will evaluate if past milestone commitments have been fulfilled and if future commitments are sufficient



# Delaware

## 2011 Milestones to Reduce Nitrogen and Phosphorus



Chesapeake Bay Program  
A Watershed Partnership

### Pollution Reduction Actions by End of 2011

#### Agriculture

Cover Crops Late Planting	18,600 acres/year
Cover Crops Early Planting	18,600 acres/year
Forest Buffers	2,700 acres
Wetland Restoration	420 acres
Tree Planting	200 acres
Poultry Litter Transport	55,100 tons/year
Nutrient Management	177,000 acres

#### Urban/Suburban

On-Site Pumpouts	8,800 systems/year
------------------	--------------------

#### Wastewater

Reduction of Invista's Permitted Load	215,350 lbs. nitrogen
---------------------------------------	-----------------------

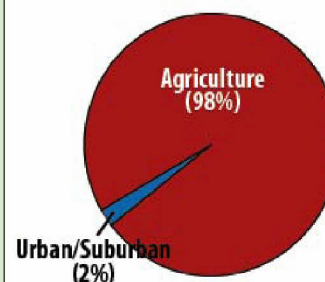
### Additional Reduction Options

#### Agriculture

- Maintain/increase acres of grass buffers  
Use Farm Bill to fund five priority BMPs through EQIP in the Nanticoke and Choptank watersheds
- Cover Crops
  - Heavy Use Area Protection
  - Irrigation Water Management
  - Nutrient Management
  - Manure Transfer

### Pollution Reductions by Source

#### Nitrogen Reductions



#### Phosphorus Reductions



# Consequences

- If we do not submit a WIP, or if the WIP is not sufficient, or if we do not submit or fulfill 2-year milestones, EPA may...
  - Require more stringent TMDL wasteload allocations;
  - Object to State-issued NPDES permits;
  - Limit or prohibit new or expanded discharges;
  - Withhold, condition, or reallocate federal grant funds

# Next Steps

- Develop Phase 1 Watershed Implementation Plan
  - Partition loads between point and nonpoint sources
  - Revisit and expand upon the Tributary Action Team Pollution Control Strategy recommendations
  - Consider future growth
  - Analyze our capacity for achieving interim and final goals
- Work towards achieving our 1<sup>st</sup> milestone goals
- Proceed with State-wide regulation revisions for stormwater and on-site wastewater systems
- Improve our best management practice tracking and reporting systems



# Questions?

## Contact Information:

Jennifer Volk,  
DNREC-Watershed Assessment  
Section

[Jennifer.Volk@state.de.us](mailto:Jennifer.Volk@state.de.us)

302-739-9939

